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DISSERTATIONS AT THE MOSCOW POWER ENGINEERING INSTITUTE IMENI MOLOTOV,
OCTOBER 1948 - JUNE 1950

Docent A. S. Sergeyev
Sci Secy, Sci Council
Moscow Power Eng Inst

During the period October 1948 - June 1950, the following dissertations
for the degree of Candidate in Technical Sciences were defended at the Moscow
(Order of L. nin) Power Engineering Institute imeni Molotov:

1. L'vov, Ye. L., "The General Theory of Calculating the Static Character-
istics of Electromagnets and Its Application to Iron-Clad and Solenoid Electro-
magnets With Flat Stops"

Official opponents: Prof K. M. Polivanov, Dr Tech Sci, and Docent B. S.
Sotskov, Cand Tech Sci

Analyzes present calculation methods and describes a newly developed
method which permits one to compute the flux near the end plane of the core and
to determine the pulling force from Maxwell's formula. Gives results of de-
tailed experimental research conducted by the author.

2. Lur'ye, L. S., "The Apparent Power of Nonsymmetrical and Nonsinusoidal
Three-Phase Systems"

Official opponents: Prof D. A. Gorodskiy, Dr Tech Sci, and Docent B. A.
Knyazevskiy, Cand Tech Sci

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Establishes the desirability of using the apparent power as a character-
istic of the actual load with respect to current and voltage of nonsymmetrical
three-phase systems. Introduces a new definition of apparent power of a three-
phase system. The concept of power of nonsymmetry is generalized to include the
case of nonsinusoidal currents.

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3. Bozovskaya, Ye. I., "The Stroboscopic Effect in Lighting Equipment"

Official opponents: Prof L. D. Esel'kind, Dr Tech Sci, and Prof S. O. Maysel', Dr Tech Sci

Investigates the stroboscopic effect observed in the illumination of moving objects by ac light sources. Analyzes various circuits for fluorescent lights used to obtain a reduction in the flicker of the total illumination. Establishes regularities in the change of flicker of the total illumination with the different light circuits. Shows how the data obtained can be used in arranging single-unit lights. Supplies practical hints for solving problems of standardization, planning, and evaluation of lighting equipment using flickering light sources.

4. Vinogradov, D. V., "The Calculation of Narrow-Band Quartz Crystal Filters"

Official opponents: Prof G. A. Levin and Ye. S. Shtyren, Cand Tech Sci

Solves the problem of designing a four-crystal bridge band filter without losses in the elements, with the smallest possible maximum attenuation in the pass band, with a given relative width of the sides and for a given value of minimum attenuation in the rejection band. Offers a method for the design of a filter having a double-peaked response and of one with four peaks if the relative value of the sides of the response and either the maximum attenuation of the filter in the pass band or the minimum attenuation in the rejection band are given.

5. Shumskiy, I. I., "The Moistening of Varnished Cambrics and a Method of Determining Their Dielectric Properties"

Official opponents: Prof S. M. Bregin, Dr Tech Sci, and Prof B. M. Tareyev, Dr Tech Sci

Determines the values of dampness of the surrounding medium and optimum time of moistening which guarantee the accuracy of electrical test measurements. Establishes the functional relationship between the amount of moistening and the conductivity of varnished cambrics. Testing of the cambric materials for volumetric resistivity, for dielectric loss angle, and for dielectric constant determined minimum values of these constants for commercial use of these materials.

6. Konopleva, Ye. N., "Interference With Radio Communications During Ionospheric Disturbances and Their Connection With Solar Processes"

Official opponents: Prof L. A. Zhekulin, Dr Tech Sci, and N. Ya. Boguslavskaya, Cand Tech Sci

With the aid of mathematical deductions, determines the magnitude of the fluctuation of critical frequencies for both a normal and a disturbed state of the ionosphere. Analyzes ionospheric data covering a number of years and notes peculiarities in the behavior of ionospheric disturbances with respect to the hour of day, season, and year of the solar cycle. Shows that ionospheric disturbances occur during specific processes observed on the sun. Outlines a method of forecasting ionospheric disturbances from such processes. This method consists basically of the application of some charts in which solar phenomena are compared with ionospheric disturbances while consideration is given to the state and behavior of formations visible on the sun.

7. Slivinskaya, A. G., "Investigation of the Permeance of Air Gaps Having Axial Symmetry"

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Official opponents: Prof. A. N. Larionov, Dr. Tech Sci, and N. Ye Lysov, Cand. Tech Sci

Examines the problem of determining the permeance of axisymmetric air gaps, which is important in the calculation and design of electrical equipment. Establishes mathematical relationships defining the permeance of the most commonly used forms of air gaps. As a general method of investigating fields with axial symmetry, the author offers a detailed graphic system of picturing the field. Use of the method permits more accurate solution of problems connected with determination of electromechanical characteristics and selection of parameters for various types of electrical equipment.

8. Sventshanskiy, A. D., "Industrial Electric Furnaces"

Official opponents: Prof. N. N. Kurnakov, Dr. Chem Sci, Prof. L. Aronov, and Engr. A. S. Lutsker

Presents a classification of electric furnaces according to principles of heat liberation and outlines fields of application of such furnaces. States the fundamental principles of heat transfer by conduction in furnaces. Mentions such specially developed materials as refractory materials, lightweight heat-insulating materials, heat-resistant materials, and materials for heating elements. Instructions are given for the selection of a special atmosphere for bright annealing, as well as for the design of units and parts of furnaces. Develops a method for selecting the proper type and number of furnaces from the technicoeconomic standpoint and the required power per unit surface of the heaters. Gives a classification of arc furnaces and develops the theory of arc stability.

9. Kremlevskiy, P. A., "Development of a Method for Testing the Corrosion Resistance of Insulating Lacquers"

Official opponents: Prof. B. M. Parayev, Dr. Tech Sci, and N. N. Sokolov, Cand. Tech Sci

The method involves the effect of chemical reagents on a lacquer film at the moment when the reagents are liberated in electrolysis. By changing the chemical make-up of the reagents, one can examine the reliability of the protection afforded by lacquer films in different media. The author reports on a device which he developed for simultaneous testing of different lacquers under identical conditions.

10. Kobyakova, N. T., "Differential Protection of Transformers Which Does Not Operate During Magnetizing Current Surges"

Official opponents: Prof. G. I. Atabekov, Dr. Tech Sci, and V. L. Kozis, Cand. Tech Sci

Examines effects occurring when power transformers are switched in and analyzes the effect of various factors on the character and magnitude of magnetizing-current surges. Using the data obtained, various differential-protection circuits are examined and evaluated. Makes recommendations for selecting and developing a differential-protection circuit for transformers which will not operate under magnetizing-current surges. For the circuit recommended, which has intermediate saturable current transformers, analyzes the effect of various factors on the operating efficiency of saturable current transformers. Describes a differential protection circuit fulfilling the specific requirements imposed on it.

11. Sasarov, V. P., "Superhigh-Pressure Mercury Lamps"

Official opponents: Prof. A. P. Ivanov, Dr. Tech Sci, and Prof. V. A. Fabrikant, Dr. Physicomath Sci

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Examines design characteristics and production technology of superhigh-pressure mercury quartz lamps of the spherical type. Gives reasons for low efficiency of incandescent lamps, some characteristics of the cold emission of the gas in an electric discharge, and properties of a discharge in mercury vapor under superhigh pressure. Suggests a method for approximate calculation of the lamps and their illuminating engineering and electrical features. Outlines possibilities for improving their spectra.

12. Mikhaylov, G. D., "The Contact Theory of Chemically Homogeneous Semiconductors"

Official opponents: Prof. Ya. I. Frankel, Corr Mem, Acad Sci USSR, and D. M. Chernyshev, Cand Tech Sci

Analyzes contact conductivity from the standpoint of two possible conductivity mechanisms: thermoelectronic and tunnel. Preference is given to thermoelectronic conductivity of the contact gap. Examines the static and dynamic conductivity of carbon powder. Derives a formula describing the microphone effect and gives practical recommendations based on it.

13. Blanter, S. G., "Electrical Equipment for Traction Substations"

Official opponents: Prof. V. Ye. Rozenfeld, Dr Tech Sci, and Docent Ye. V. Chebotarev, Cand Tech Sci

Discusses calculation methods and criteria in selecting electrical equipment for streetcar and trolley bus traction substations. States and analyzes design principles of substation switching circuits. Examines design requirements for substation components, analyzes design solutions, and makes corresponding recommendations. Compares nonautomatic and automatic remote-controlled substations. Develops basic principles of radically new types of single- and double-unit automatic traction substations for decentralizing the power supply of traction systems. Clarifies important aspects of the technical operation of traction substations.

14. Tsarev, M. I., "An Analysis of the Operation of the Differential Protection of Transformers Under Transient Conditions and Methods of Improving It"

Official opponents: Prof. A. M. Fedoseyev and I. A. Syromyatnikov, Cand Tech Sci

Reports results of a theoretical and experimental investigation of transient conditions in differential protection circuits of transformers subjected to external and internal short circuits and to magnetizing-current surges. Analyzes the operation of the various types of differential protection under transient conditions and explains the better methods of eliminating unbalance currents caused by defects in current transformers and magnetizing-current surges. Describes practical methods of improving the differential protection of transformers.

15. Frid, Ye. S., "Calculation of Impulse Gradients in Transformer Windings"

Official opponents: Prof. V. A. Karasev, Dr Tech Sci, and Docent M. V. Lipkovskiy, Cand Tech Sci

Describes a method of determining the gradients in multicoil transformer windings subjected to an impulse voltage. The method provides a graphic picture of the processes determining the impulse gradients in transformers, permitting evaluation of the various factors affecting the gradients.

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16. Vaynberg, A. M., "Investigation of Modern Amplidyne Systems For Automatic Regulation of Steel-Smelting Arc Furnaces"

Official opponents: Prof D. P. Morozov, Dr Tech Sci, and Docent E. G. Uderman, Cand Tech Sci

Reports on experiments with the following modern amplidyne regulators for arc furnaces: a regulator using an amplidyne developed by the All-Union Electrical Engineering Institute, known by the trade name "Amplidyne," in an arc furnace of 100-kg capacity built by the ETA Laboratory of the Moscow Power Engineering Institute; a regulator of the 1.5-ton furnace of the Neva Shipbuilding Plant using an amplidyne known as Pototrol; and a regulator on the 3-ton furnace of the State Bearing Plant imeni Kaganovich using an amplidyne known as Regulex.

17. Gornshbeyn, V. M., "The Most Efficient Load Distribution Among Electric Power Stations Operating in Parallel"

Official opponents: V. M. Markovitch, Dr Tech Sci, and Docent N. A. Mel'nikov, Cand Tech Sci

States the general theory of the method of relative increments, the characteristics of boilers and boiler systems, the characteristics of turbogenerators and turbine equipment, and the distribution of loads between electric power stations. Determines the economy of starting and stopping of machines in electric power stations. Computes the cost of energy for the internal needs of electric power stations. Examines the distribution of the load among the electric power stations when the power system is operating under special conditions. Determines the form of the graph for hydroelectric power stations working in parallel with steam-electric power stations, etc.

18. Kuvayeva, A. E., "Investigation of Methods for Raising the Overload Capacity of Induction Motors"

Official opponents: Prof S. N. Ryzanov, Dr Tech Sci, and Docent I. I. Petrov, Cand Tech Sci

Examines the following methods of increasing the magnetic field of the motor: (a) by supplying a higher voltage to the motor terminals, (b) by connecting capacitors in series with the stator winding, (c) by decreasing the number of turns of the stator winding, (d) by connecting an active resistance in series with the stator winding when the motor operates as generator. Establishes a method of calculating the characteristics of a motor and the effect of overload on its parameters. Investigates the effect of saturation of the main field circuit on the characteristics of the motor. Compares overloading methods from the standpoint of increasing starting and critical torques, cutting down losses and the time required for starting under load, and reducing the power drawn by the motor operating with a short duty cycle.

19. Kuznetsov, V. M., "Investigation of Possible Methods of Increasing the Efficiency of Traveling-Wave Antennas"

Official opponents: Prof A. A. Pistol'kors, Corr Mem, Acad Sci USSR, and G. T. Markov, Cand Tech Sci

Analyzes the traveling-wave antenna and describes the development of a highly efficient modification thereof. Compares the modified antenna with the rhombic antenna and with existing traveling-wave antennas.

20. Bessmertnyy, I. S., "A Method of Studying Voltage Conditions in Calculations of Municipal Electric Power Systems"

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Official opponents: Prof A. A. Glazunov, Dr Tech Sci, and Docent N. A. Mel'nikov, Cand Tech Sci

Uses mathematical statistics, particularly the theory of distribution functions, for study of this problem. Develops a method in the form of a graphical construction and an approximate formula which makes it possible to improve calculation methods used in the design of municipal electric power systems. The method opens the way for corrections in the appropriate sections of the guides now in force.

21. Zhukov, B. A. "Some Problems Concerning the Theory of Operation of Synchronous Generators With Compound Exciters"

Official opponents: I. M. Markovich, Dr Tech Sci, and Docent V. A. Venikov, Cand Tech Sci

Continues P. S. Zhdanov's studies on the theory of excitation circuits of synchronous generators with compound rectifiers. Studies the possibility of extending the zone of artificial stability now used by compounding excitation circuits, introducing a new flexible feedback, not used in present excitation circuits, which reacts to the rate of change of the generator's exciting current. Analyzes the effect of various parameters of the generator's excitation circuit on the quality of its voltage regulation, and suggests best types of excitation systems. Investigations were based on the parameters of typical turbogenerators, assuming compound generators with differing degrees of compounding are used as exciters.

22. Moskalev, A. G. "Automatic Frequency Regulation in Electric Power Systems"

Official opponents: I. M. Markovich, Dr Tech Sci, Prof P. S. Zhdanov, Dr Tech Sci, and Docent V. A. Venikov, Cand Tech Sci

Proposes a method of frequency regulation on the basis of simulated astatic characteristics. Lists merits of the method: maintains the frequency on the assigned level regardless of the load on the regulated units; provides stable fixed distribution of the load among the regulated units; applicability for regulation of a number of units, or a number of stations, etc.

23. Borisov, V. A. "Investigation of the Operation of an Amplidyne With Transverse Excitation as a Motor"

Official opponents: Prof D. P. Morozov, Dr Tech Sci, and Docent N. P. Kunitskiy, Cand Tech Sci

Shows that an amplidyne may be used not only as a generator but also as a motor. Motors of this type will have the following characteristics: smooth speed regulation using negligible power for control; possibility of speed control as a simultaneous function of several parameters; possibility of changing the form of its natural mechanical characteristics from straight shunt to modified series, and facility of maintaining constant speed with sufficiently high accuracy without the use of special regulators. Operation of an amplidyne as a motor may prove useful in special electric drives where low control power is a requirement, in controllable electric drives requiring constant speed, and in special multimotor systems of automatic electric drives.

24. Salgus, G. K., "A Capacitive Electric Machine Regulator"

Official opponents: Prof D. P. Morozov, Dr Tech Sci, and Prof A. N. Iarionov, Dr Tech Sci

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Analyzes in detail the operating principle of electric machine regulators, their self-excitation conditions, and the phenomena present under load. Treats questions connected with the method of design, the principle of operation, and the use of a capacitive electric machine regulator in automatic control and regulation circuits.

25. Slezhanovskiy, O. V., "Investigation of Electric Drives With Amplidyne as Exciters"

Official opponents: Prof D. P. Morozov, Dr Tech Sci, and Engr N. A. Tishchenko

Analyzes the static and dynamic properties of an electric drive using different types of control circuits in order to facilitate selection of a circuit and its parameters according to requirements for certain static characteristics, improve the utilization of the machines, and provide the necessary stability. Shows that circuits with amplidyne control permit more efficient utilization of the motor than relay-control circuits and consequently provide higher productivity for the mechanism.

26. Vinit'skiy, A. S., "Modulated Resonators"

Official opponents: Prof Ye. B. Kobzarev, Dr Tech Sci, and Prof S. M. Rytov, Dr Tech Sci

Offers a number of measuring devices employing resonators modulated similar to wide-band frequency modulation. Shows a method for extending the results obtained for a single loop to a multiloop circuit of frequency-modulated resonators and to resonators having several resonance peaks, which are frequency-modulated out-of-phase. Gives some examples of the practical application of modulated resonators (for measurement of torque on a shaft, as a multisegment capacitive transmitting element, etc.).

27. Vasil'yeva, N. P., "The Design of Measuring Circuits Having Instrument and Output Transformers"

Official opponents: Prof N. I. Chistyakov, Dr Tech Sci, and Prof V. N. Mil'shteyn, Dr Tech Sci

Analyzes the operation of output transformers in measuring circuits and gives a method for determining the optimum parameters of transformers for a given measuring circuit. Describes a general method of estimating the error caused by instrument transformers in a given measuring circuit. Develops requirements which transformers must satisfy so that the errors which they introduce will not affect the accuracy of the measurement.

28. Vaar, L. A., "Calculation of Active Power Losses in Selecting Cross Sections of Wires and Cables"

Official opponents: Prof V. Ye. Rozenfel'd, Dr Tech Sci, and V. I. Lapitskiy, Cand Tech Sci

Examines problems of technical and economic analysis in the field of power engineering, such as the percentage rate of amortization and running maintenance. Emphasizes need for consideration of efficiency of capital investments, special consideration of power losses and cost of energy losses.

29. Bakinovskiy, V. L., "Finding the Damaged Point on Power and Communication Lines by the Pulse Method"

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Official opponents: Prof. V. Yu. Lomonosov, Dr. Tech Sci, Docent P. V. Borisoglebskiy, and Docent M. D. Gurevich, Cand. Tech Sci

Describes theoretical investigations and an experimental test conducted by the author in the Central Scientific-Research Electrical Engineering Laboratory of the Ministry of Electric Power Stations in the field of pulse measurements on various types of lines as the basis for the wide introduction of the pulse method into operational use. Surveys literature on pulse measurements on lines, and clarifies problems connected with sensitivity, accuracy, and the computation of basic parameters of pulse instruments.

30. Larionov, V. P. "Impulse Discharge in a Long Air Gap at Atmospheric Pressure"

Official opponents: Prof. V. W. Burgdorf, Dr. Tech Sci, and A. P. Belyakov, Cand. Tech Sci

Gives a method of artificial generation of steps in the leading stage of a discharge, and explains the mechanism of their formation. Shows the reasons for the formation of steps in the positive leader when an additional capacitance is connected in parallel with the discharge gap. Demonstrates the step is analogous in all its manifestations with the main discharge. Presents a method for experimental determination of average potential gradients along the channel of the leader. Obtains the dependence of the average gradients in the channel of the positive leader on the value of the retarding resistance in the discharge circuit.

31. Puchkovskiy, V. V. "Testing the Insulation of Electric Machines by the Self-Discharge Method"

Official opponents: Prof. V. Yu. Lomonosov, Dr. Tech Sci, Prof. P. G. Grudinskiy, and L. G. Manikonyants, Cand. Tech Sci

Reports on a method of self-discharge for testing the insulation of electric machines suggested by the author in 1945. Shows that the rate of voltage decay is connected with the moisture of the insulation (thus making measurement of the speed of self-discharge a method of testing the moisture) and further that the speed of self-discharge is more sensitive to moisture than are loss angle, leakage currents, and insulation resistance. In addition, the sensitivity to moisture changes very little when low voltage is used instead of high voltage (which opens up possibilities for low-voltage testing), and thus for operational testing there is no need for plotting all characteristics of the self-discharge.

32. Zhits, M. E. "Investigation of the Self-Excitation of Series Electric Traction Motors of City Transport Rolling Stock Under Rheostat-Braking Conditions"

Official opponents: Prof. S. A. Poroshnev and Docent B. I. Petrov, Cand. Tech Sci

States a method which makes possible complex theoretical study of unstable conditions in rheostat braking of series electric traction motors, and of state accounted for by certain motor control circuits and the characteristics of the motor (its winding, frame construction, main poles and rotor, size of the gap, etc.). With certain changes, the method permits one to examine a number of other switching processes in motors such as the rise and fall of the current, changes in the current observed during various types of transient conditions, etc.

33. Ragozin, Yu. D., "Electronic Ratiometers"

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Official opponents: Prof V. Yu. Lomonosov, Dr Tech Sci, and B. I. Petrov, Cand Tech Sci

Presents a pulse ratiometer which permits one to measure the ratio of the instantaneous values of two sign-variable voltages by means of an averaging RC circuit.

34. Filippov, B. A., "Investigation of an Electric Machine Excitation Control System for the Generator of a Reversible Electric Drive"

Official opponents: Prof A. T. Golovan, Dr Tech Sci, and A. Ya. Lerner, Cand Tech Sci

Offers a system of excitation control for the generator of a reversible electric drive having none of the shortcomings of the present systems. An experimental check on models in the Electric Drive Laboratory, Moscow Power Engineering Institute, confirmed the correctness of the author's design and the soundness of the final conclusions with regard to the advantages of the suggested changes in the electric drive system. The improvements may be applied to systems already in use.

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